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Study of the temporal nutrient dynamic of a temporary Mediterranean river receiving direct sewage effluents.

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Arid and semiarid areas where the temporary rivers and streams occur, account for one third of the earth's surface land area. However, little is known regarding their hydrologic and biogeochemical behaviour. In the European Community, all water resources have to be monitored following the requirements outlined in the Water Framework Directive (WFD-2000/60/EC). The temporary rivers provide a significant challenge in developing appropriate sampling strategy for their monitoring.

The objective of this work is to characterize the nutrient dynamic on the Vène River for different hydrological conditions. To this aim, a strategic sampling was realized on this river. We selected key locations located upstream and downstream the most important point- and/or diffuse-pollution sources. 23 sampling stations were chosen: 13 sites are located in the main river and 10 sites concern direct inputs (including two sewage inputs). The spatial sampling realized all along the river was conducted on a one-day survey campaign for different hydrological conditions (including periods of very low flow and high flow). At each station, grab water samples were collected and were analysed for the different nitrogen (N) and phosphorus (P) forms. Additionally, automatic samplers coupled to three stream-gauges installed along the river permitted to collect water samples during flood events.

The first results were obtained for two one-day survey campaigns which occurred in June and September 2009 at, respectively, the beginning and the end of the dry period. During these periods, the karstic spring was dry and the two wastewater inputs contributed to a great share of the flow discharge (up to 80 %). Concerning the water quality, a similar trend was observed for the evolution of N and P concentrations all along the river course, i.e., an increase was observed just after each sewage inputs (up to 2400 μg/l for ammonium and up to 4900 μg/l for total phosphorus), followed by a drop of concentrations. In comparison with concentrations obtained previously during high flow periods, these concentrations are 5 to 10 fold higher and overtook the environmental quality standards (EQS) proposed by the water framework directive. During the flood event that occurred after the dry period, high concentrations of particulate N and P, previously stored in the riverbed, were measured in water samples. These preliminary results highlight the difficulty of monitoring the temporary rivers, and the need to consider the different hydrological conditions.